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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/771,091

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EXAMINER

ROY, SIKHA

ART UNIT

PAPER NUMBER

2879

MAIL DATE

DELIVERY MODE

07/06/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/771,091

Applicant(s)

LEE ET AL.

Examiner

Sikha Roy

Art Unit

2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 1-14 and 18-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15-17 and 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 30, 2007 has been entered.

Claims 1-14 and 18-20 have been withdrawn.

Claims 15-17 and 21 are pending in the instant application.

Claim Objections

Claims 16 and 17 are objected to because of the following informalities:

Claims 16 and 17 are shown as withdrawn but they are pending and hence '(withdrawn)' should be deleted.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 15 –17 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over GB 2349979 to Burroughes et al. and in view of U.S. Patent 6,737,800 to Winters et al. and U.S. Patent Application Publication 2003/0193284 to Park et al.

Regarding claim 15 Burroughes discloses (Fig. 3 page 6 paragraphs 2,3 page 10 paragraphs 3,4) a method of fabricating an organic electroluminescent display comprising the steps of disposing sequentially a first anode material (reflective metallic layer 12) and a second anode material (ITO layer) 13 of pixels 20 on a substrate 10, masking and etching the first and second anode materials to isolate and form anode electrodes of different pixels, each including first anode electrode 12 and second anode electrode 13, disposing organic thin film layers 14,15 patterned on the second anode electrode and then disposing cathode electrode 16 over the entire surface of the substrate. Burroughes discloses (page 3 last paragraph) the first metallic anode electrode is suitably reflective, made of aluminum layer and the second anode material made of ITO has a relatively high work function (page 4 paragraphs 3,4). Furthermore the Examiner notes that the second anode of Burroughes is made of ITO, the same material as that of the second film of the applicant and hence will have the same inherent capability of adjusting work function.

Regarding claim 15 Burroughes discloses (Fig. 3 page 4 last paragraph) a multi-pixel light emitting device having different pixels with region suitably comprising one or more individual organic materials, suitably polymers or conjugated polymers. Burroughes does not exemplify red, green and blue unit pixels (which is very well known

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in the art for multi-color display) and the second anode of at least one pixel having a thickness different from the thickness of the second anodes of other unit pixels of red, green and blue pixels.

Winters in same field of endeavor discloses (Figs. 1 and 3 column 3 lines 40 through column 4 line 6, column 4 lines 19-34, column 17 lines 4-12, column 18 lines 17-61) method of forming organic electroluminescent display having pixels of red, green and blue (three primary colors) comprises forming first anode electrodes (reflective layer) 102 and second anode electrodes (first transparent electrode) 112, disposing respective organic thin film layers and disposing a cathode electrode on the entire surface of the substrate. Winters further discloses the thickness of the second anode electrode 112a in one pixel (red pixel) is different from the thicknesses of the second anodes 112b, 112c of other unit pixels of green and blue and are formed by well known photolithography and etching processes. Winter teaches (column 18 lines 50-65) the thicknesses of second anode electrodes for different pixels are varied so that reflected components of light emitted from a particular colored pixel constructively interfere with non-reflected component and thus enhance the emission efficiency.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include red, green and blue unit pixels of three primary colors and thickness of second anode of at least one unit pixel of one color different from that of other unit pixels as taught by Winters in the method of forming organic electroluminescent display of Burroughes for providing a multicolor display and the benefit of reflected components of light of a particular color emitted from one colored

pixel constructively interfere with non-reflected component and thus enhance the emission efficiency.

Burroughes and Winters disclose the second anode of at least one pixel different in thickness from other second anode of red, green and blue pixel units but are silent about the first and second anode materials patterned by using photosensitive film patterns having thicknesses different from each other depending upon the red, green and blue unit pixels.

Park in pertinent art of method of fabricating flat panel display discloses (Figs. 2A-2C para [0025]-[0029], [0037]) the method comprising forming a pixel electrode 212 in region 202 and a black matrix 225 in a region 201 on the substrate at the same time by forming photosensitive film patterns 232 and 231 from the photosensitive layer 230 using halftone mask 300 in regions 202 and 201 respectively having thickness different from each other and etching them. The pixel electrode is formed in the region 202 and the black matrix is formed in the region 201 by the thickness difference between the photosensitive patterns. Park further teaches this fabrication method using photosensitive film of different thicknesses simplifies the method of forming two layers since separate masking operation to form the two layers is not needed and two items (layers of pixel electrode and the black matrix) are simultaneously formed on the substrate.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to employ the fabrication method of forming the first and second anodes of different thickness of Burroughes and Winters by the photosensitive film patterns having

different thicknesses using halftone mask and then patterning them as taught by Park. This method provides the benefit of forming two different second anodes in a single masking operation and thus simplifies the fabrication method.

Regarding claim 16 Winters discloses (Fig. 3) the second film of 112a of red unit pixel is thicker than the other unit pixels.

Regarding claim 17, Burroughes^{Park} and Winters disclose the claimed invention except for the limitation of the thickness of second film of red pixel in the range of 250 to 450°A and 700 to 750 °A, thickness of second film of green unit pixel is in the range of 50 to 150°A and 200 to 300 °A and thickness of the second film of blue unit pixel is in the range of 50-150°A. It is noted that Winters discloses (column 16 lines 35,36,55,56, column 17 lines 4-12) that depending on the wavelength λ of light (color) emitted from a pixel having a particular second film (with a refractive index), thickness differs according to the equations 1 and 2 and an optimum thickness can be calculated and separately adjusted for different color unit pixels. Furthermore it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the ranges of thicknesses of second anodes of red, green and blue pixels as claimed, since optimization of workable ranges is considered within the skill of the art.

Regarding claim 21 Park discloses (para [0028]) the photosensitive film patterns of different thickness formed by a photo process using halftone mask.

Response to Arguments

Applicant's arguments with respect to claim 15 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent Application Publication 2003/0186478 to Morita et al. and U.S. Patent Application Publication 2003/0107326 to Park et al. disclose a photolithographic process using halftone mask comprising a light-shielding section and a semitransparent section and thus forming photoresist patterns of varying film thickness.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sikha Roy whose telephone number is (571) 272-2463. The examiner can normally be reached on Monday-Friday 8:00 a.m. – 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar D. Patel can be reached on (571) 272-2457. The fax phone number for the organization is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Sikha Roy

Sikha Roy
Primary Examiner
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